Supercomputing

Climate-in-a-Box System Overview
Science Mission Directorate

NASA has a goal to broaden the audience for model development, promoting cross-institutional collaboration with code and data sharing. The Climate-in-a-Box (CIB) project produces a complete, ready-to-use toolkit of climate research products for investigators, with a focus on ease-of-use and collaboration.
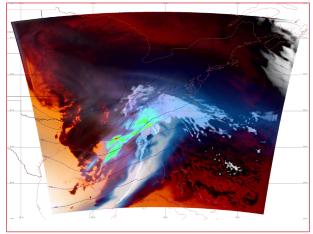
CIB was designed for smaller "desktop supercomputers" and Linux clusters to enable rapid development and quick turnover. The goal is for users to utilize these smaller platforms for testing coarse-resolution runs, and then later transition to large supercomputing clusters for production runs.

Reproducibility is a priority for the project, both to ensure accurate science and to allow scientists to return to NASA's supercomputing clusters to perform larger experiments. This approach helps scientists remain productive with their time and computational hours, and also frees up the supercomputers, such as the Discover cluster at the NASA Center for Climate Simulation, to run larger, higher-resolution experiments.

The CIB project has a core focus in "open" model development, which can positively impact global climate change research by enabling greater cooperation in the research process. A Distributed Modeling System aspect of the CIB project studies the issue of establishing a system with data-sharing across several institutions to promote collaboration.

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View from a Weather Research and Forecasting (WRF) Model simulation of the February 5–6, 2010 U.S. East Coast "Snowmageddon" storm. This image overlays surface downward flux (orange-black) with mid-atmosphere humidity (blue-white), geopotential height (blue contours), and cumulative precipitation (green/blue/red). *Phil Hayes, John Evans, NASA/Goddard*